



Elementary students in Dripping Springs, Texas, are learning more thanks to a play-ground shuttle mock-up. Story on Page 3.



JSC's computer graphics analysis group has added some more room around the shoulders. Photo on Page 4.

Space News Roundup

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No. 38

Top engineers tackle Columbia's hydrogen leaks

Discovery cuts in line to launch Ulysses in early October

By James Hartsfield

While a special panel of top engineers tackles *Columbia's* hydrogen leak problems full-time, preparations at Kennedy Space Center are now geared toward the launch of *Discovery* on STS-41.

KSC is tracking an Oct. 5 launch for *Discovery*, but that schedule is extremely tight and a firm date won't be set until after STS-41's Flight Readiness Review is held Monday and Tuesday. Current planning, though not set in stone, is to launch *Columbia* and the Astro-1 telescope payload around Dec. 1, after *Atlantis* is launched in early November on STS-38, a Department of Defense-dedicated

flight.

Following a leak that let hydrogen reach concentrations of almost 4,000 parts per million in *Columbia's* aft fuselage during fueling for Tuesday's launch attempt, Space Shuttle Program Director Robert Crippen appointed a Hydrogen Leak Investigation Team to locate the leak.

The team is led by Robert Schwinghamer, deputy director for Space Transportation Systems at Marshall Space Flight Center. Other members include JSC's Chester

Vaughan, chief of the Propulsion and Power Division; A.L. Worlund, deputy director of Marshall's Propulsion Lab; Warren Wiley, deputy director of Vehicle Engineering at KSC;

Horace Lamberth, vice president of Shuttle and Ground Support Engineering for Lockheed at KSC; Steve Cavanaugh of Rockwell-Downey; Paul Seitz of Rocketdyne; and

John Cool of Martin Marietta.

"They will be based out of KSC and will devote full time to solving this problem," Crippen said. "They will report directly to me,

and I've asked the Space Shuttle Program to provide Mr. Schwinghamer and his team every available assistance to aid in solving this critical problem."

The crew was disappointed following Tuesday's fourth scrubbed launch, but understanding. "Most of us have been involved in the space flight business for some time, and we know from experience that hardware problems can be difficult and it does not pay to fly until the spacecraft is ready," STS-35 Commander Vance Brand said. "The ASTRO-1 astronomy mission is very worthwhile, and the crew is ready and anxious to fly as soon

Please see **DISCOVERY**, Page 4



STS-41
Ulysses

JSC awaits word

Furlough deadline approaches

The Oct. 1 deadline for a possible one-day furlough for government employees neared this week as White House and congressional negotiators continued their budget talks in Washington, D.C.

"We're still awaiting word," said JSC Human Resources Director Jack Lister. "We're still on notice that if the budget is not resolved by Oct. 1, we will be subject to a furlough during the first two weeks of October."

Unless Congress passes a deficit reduction program by Oct. 1, the Gramm-Rudman-Hollings law will require program and personnel cuts throughout the government. NASA and other non-defense agencies would have to cut about 31.9 percent from fiscal 1990 spending levels.

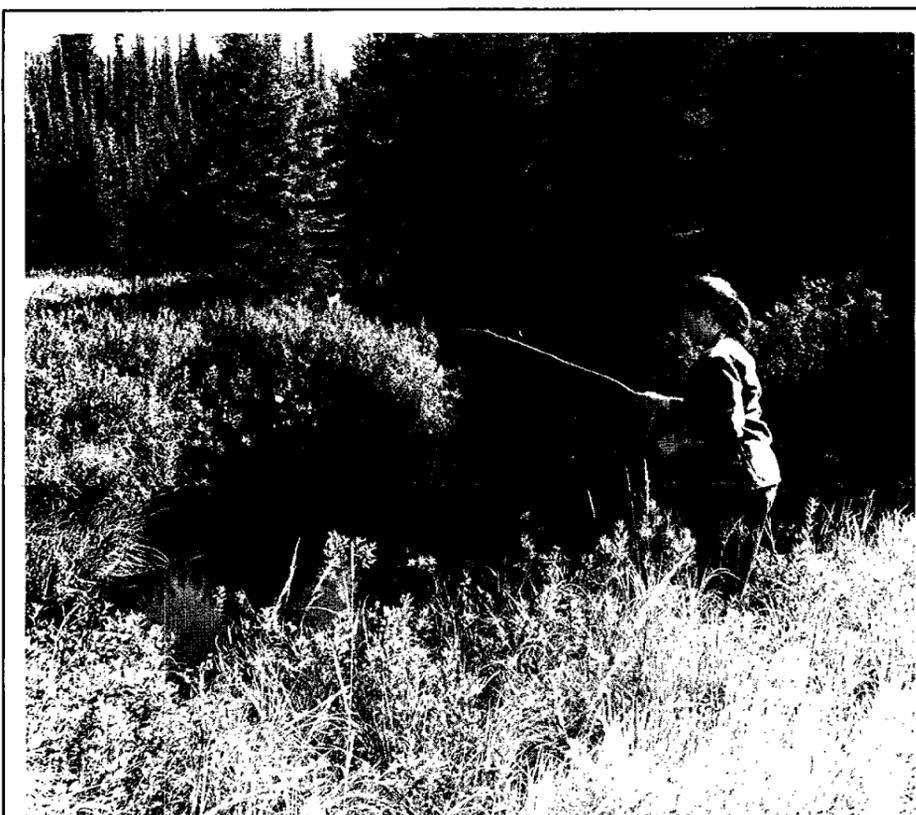
This week, the budget negotiators reduced the size of their group and moved the talks from Andrews Air Force Base to the White House.

NASA Administrator Richard Truly said recently that if a sequester order is issued, the agency could be forced to furlough all civil servants for one day during the first two weeks of fiscal 1991. Further delays in the deficit reduction program could mean as many as 22 furlough days.

JSC Director Aaron Cohen is allowing each directorate to decide how and when, within the 15-day period, to implement any unpaid, non-working furlough.

Directors are being urged to implement any furlough early in the period to avoid adverse effects on the STS-41 mission, set to launch Oct. 5. All employees will be required to take any furlough in one-day increments.

Lister said the possibility of a continuing resolution that would temporarily suspend the Gramm-Rudman-Hollings sequestration has been mentioned, but that President Bush has indicated he would not sign such a bill.



JSC Photo by Jack Jacob

ASTRONAUT ANGLING—Janice Voss, a member of the astronaut candidate class of 1990, tries her luck with a make-shift fishing pole during recent wilderness survival training. The candidates spent a week at Fairchild Air Force Base in Washington learning how to live off the land and signal rescuers. Wilderness training is just one facet of the year-long preparation for their new jobs.

Magellan begins mapping; images 'Gumby' valleys

By Pam Alloway

NASA released Magellan's latest pictures of Venus on Monday as the spacecraft started the third day of its 243-day radar-mapping mission of the Venusian surface.

The pictures show valleys that resemble the animated character Gumby and a meteorite crater that scientists said is unlike any seen in the solar system.

The spacecraft began bouncing radar off Venus on Saturday when it received computerized commands radioed 154.9 million miles from Earth.

Another picture shows a belt of mountains and valleys scientists believe may have been formed by a huge landslide that occurred as nearby highlands gradually collapsed. The mountainous belt is located in the planet's northern hemisphere.

The picture of the meteorite crater that captured scientists' attention is located south of Venus' equator. The image is kidney-shaped rather than circular, which surprised geologists.

Scientists have said they hope Magellan will provide the most complete and detailed imaging ever of Venus, a planet draped within a thick cloud cover.

Scientists enthusiastically welcomed Magellan's latest pictures as a sign they had fully restored communications with the spacecraft. Magellan earlier this year experienced two perplexing communication losses with ground controllers at NASA's Jet Propulsion Laboratory in Pasadena, Calif.

The spacecraft began its latest radar-mapping
Please see **MAGELLAN**, Page 4

Dunbar USML-1 payload commander

Extended duration mission focuses on microgravity research

By Barbara Schwartz

Astronaut Bonnie J. Dunbar, Ph.D., has been named payload commander for the STS-50 U.S. Microgravity Laboratory (USML-1) mission currently scheduled for March 1992.

USML-1 consists of a complement of experiments focusing on microgravity materials processing technology and other science and research requiring a microgravity environment. Orbiter *Columbia* will be modified with an Extended Duration Orbiter kit that will provide additional expendable supplies for a 13-day

mission of extended scientific research.

As payload commander, Dunbar is responsible for coordinating all payload requirements for the mission.

Dunbar was a mission specialist on STS-61A, the 1985 West German D-1 Spacelab mission, and the January STS-32 mission on which the crew deployed the Syncom IV-F5 satellite, retrieved the Long Duration Exposure Facility, and performed a variety of middeck scientific experiments.

Four candidates for two payload specialist positions on STS-50 were named in August with a final selection to be made in March 1991. The candidates are Lawrence J. DeLucas, O.D., Ph.D., University of Alabama; Joseph Prael, Ph.D., Case Western Reserve University; Albert Sacco Jr., Ph.D., Worcester Polytechnic Institute; and Eugene H. Trinh, Ph.D., NASA's Jet Propulsion Laboratory.

The remainder of the seven-member crew will be announced later.



Bonnie J. Dunbar

Pioneer 10 marks new epoch in solar system exploration

NASA's Pioneer 10 spacecraft, the first to leave the solar system, will reach another milestone Saturday. At 3:19 p.m. CDT, it will be 50 times farther from the Sun than the Sun is from Earth.

Reaching the 50 astronomical unit distance "marks a new epoch in exploration of the outer solar system," according to Pioneer experimenter James Van Allen of the University of Iowa.

Van Allen, discoverer of the radiation belts around the Earth that bear his name, said reaching the 50 AU distance "has been a goal of physicists for many decades." When Pioneer 10 reaches that mark, it will be 4,647,809,899 miles from Earth. Pioneer already has traveled farther than any human-made object.

The AU—the average distance (93 million miles) between the Sun and Earth—is the primary unit used to

measure distance within the solar system.

Launched on March 2, 1972, Pioneer continues to make discoveries about the limits of the sun's atmosphere, called heliosphere. The spacecraft is seeking the boundary between the solar heliosphere and the true interstellar gas. Pioneer also continues to search for the first gravity waves to be detected and for data on the location of a possible 10th planet.

Pioneer left the solar system planets behind on June 13, 1983. Communication is expected to continue until the year 2000, when Pioneer will be 6.9 billion miles from the Sun.

The TRW-built spacecraft's tiny 8-watt radio signal now has fallen to a signal strength of four billionths of a trillionth of a watt when it finally reaches the football-field-sized antennas of NASA's Deep Space

Network. Round-trip radio transmission time is Earth is 13 hours, 47 minutes at the speed of light (186,000 miles per second). Pioneer's current speed is about 28,900 mph.

Pioneer's most important finding about the outer solar system is the extent of the sun's heliosphere, originally thought to have ended at the orbit of Jupiter. Pioneer is now almost 10 times farther away and still within the solar heliosphere.

JSC

Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Gift Store from 10 a.m. to 2 p.m. weekdays.

General Cinema (valid for one year): \$3.75 each.
AMC Theater (valid until May 1991): \$3.50 each.
Sea World (San Antonio, year long): adults, \$17.25, (two-day \$21.95); children (age 3-11) \$14.75, (two-day \$18.95).

Astroworld (valid 1990 season): adult \$15.97; children \$9.21; season pass, \$39.95; Waterworld, \$8.15; two-day—AW/WW \$18.47.

Lovin' Feeling Concert (7:30 p.m. Sept. 29, Summit): \$16.
Texas Renaissance Festival Bus Trips (Oct. 13 or Nov. 10): child, \$6 (under 5), \$9; adult, \$12.

Texas Renaissance Festival (Saturdays and Sundays Oct. 6-Nov. 18): adults, \$8.95; children, \$4.95.

JSC-EAA Travel Fair (Oct. 4 from 4:30 p.m. to 8:30 p.m. — Must pick up tickets from Bldg. 11 store — Major airlines, tour companies and cruise lines will be present & drawings will be held throughout the evening): FREE.

JSC

Gilruth Center News

Sign up policy—All classes and athletic activities are first come, first served. To enroll, you must show badge or EAA card and pay at the Gilruth Recreation Center. Classes tend to fill up four weeks in advance.

EAA badges—Dependents and spouses may apply for a photo I.D. 6:30-9:00 p.m. Monday-Friday.

Defensive driving—Course is offered from 8 a.m.-5 p.m., Oct. 13 and Nov. 17; cost is \$15.

Aerobics and exercise—Both classes are ongoing.

Ballroom dance—Professional instruction in beginning, intermediate, and advanced ballroom dancing. Classes begin Oct. 4 and meet Thursday for eight weeks. Beginning and advanced classes meet 7-8:15 p.m. Intermediate class meets 8:15-9:30 p.m. Cost \$60/couple.

Flag football—Registration will be done by a lottery system the week of Oct. 1. Come by Gilruth, Rm. 146 for more information.

Softball tournament—Last Men's Open "C" Tournament of the year is Sept. 29 & 30; fee is \$95. Entry deadline 7:30 p.m. is Sept. 27.

JSC

Technical Library News

These new publications are available in the JSC Technical Library, Bldg. 45, Rm. 100.

Goddard Conference on Space Applications of Artificial Intelligence, NASA, 1990.

Report of NASA Lunar Energy Enterprise Case Study Task Force, Langley Research Center, 1989.

High Resolution Air- and Spaceborne Radar: Papers Presented at the Avionics Panel Symposium held in The Hague, Netherlands, May 8-12, 1989, AGARD, TL 500.N63 A24 no. 459.

Orbital Mechanics and Mission Design, AAS/NASA, 1989, TL 790. Ad9 v.69.

Starlight Handbook: A Pioneer's Guide to Interstellar Travel, Mallove, Eugene F., 1989, TL 790.M26.

Flight Mechanics/Estimation Theory Symposium, NASA, 1989, TL 1050.F58.

JSC

Swap Shop

Property

Rent: 2 BR duplex, AC, new carpet, refig., range, new paint, avail. 9/1, \$325/mo. Cooper, 484-0775.

Sale: Friendswood, Mustang Meadows, 2.03 acres, util. avail. 481-4187.

Sale: Lake Livingston, 3-2, lake view, deck, \$59K, x32202 or 538-2417.

Sale: W/Infrt. beach house on pilings, 3-2-3 on San Bernard River. 862-3929.

Rent: Heritage Park, lg. 3 BR, FPL, new paint, no pets, \$775/mo. 282-2787 or 532-1240.

Rent: Lake Travis cabin, priv. boat dock, CA/H, equipped, accomm. 8, wkly/dly, \$325/\$80. 326-5652.

Sale/Lease: Baywind II condo, ground floor, 1 BR, W/D conn., FPL, \$365. 486-0898.

Sale: Warehouse, 13K sq. ft. on 1.1 acres, Bayview, 1 blk. from bay, \$85K. 776-2375 or 339-1957.

Sale: L.C. & I. 45, 3-1, fence, \$395/mo. 332-0365.

Sale: Univ. Green, 2-1-2 patio home, fen., new paint, vaulted ceiling, miniblinds, drapes, fans, FPL, deck, \$76K. 480-7338.

Rent: Galveston condo, Seawall & 61st, sleeps 6, furn., dly/wknd/wkly rates, pool, cable. x33479 or 486-0788.

Sale: Shoreacres, contemp., 4K sq. ft., 5-4 study plus mother-in-law suite, wkshp. on wooded 1 1/3 acre, \$114,900. x38039 or 333-1751.

Sale: Lg. lot, 120x162 in Friendswood, all util., \$35K. Rick, 283-1988 or 996-8961.

Lease: Room in big house, wkly maid, \$270/mo. Eric, x38420 or 484-9179.

Lease: CLC condo, 1 BR, avail. now, FPL, all appl., fan, W/D conn., exer. room, tennis. Jim Briley, 488-7901.

Sale: Friendswood, 3-2-2D, contemp., atrium, FPL, decking, whirlpool, new paint, \$93K. 482-2138.

Sale: Limestone County, 40 acre pastureland on paved road, fen., ponds, barn, corral, catch pen, 2-2 mobile home, sell by owner, \$68K. 479-3965.

Lease: Tree house in CL Shores, 2-1, nice carpet, CA/H, W/D conn., fans, deck, \$625/mo. 538-1849.

Sale/Lease: 3-1.5-2, Alameda mall area, CA/H, fenced backyard, disp. DW, built-ins, PISD. x33656 or 486-8276.

Lease: CLC/Oakbrook West, 4-2.5-2D, contemp., lg. LR/DR, FPL, sec. sys., gar. opener, no pets, \$895/mo. 482-6609.

Lease: Sycamore Valley/Ellington, 3-2-2, FPL, formal DR, ins. util. rm., miniblinds, fen., new carpet, no pets, \$695/mo. 482-6609.

Sale: Meadowband, 3-2-2, gas/elec., miniblinds, fans, microwave, gar. door opener, 10 yr. warr., 8.5% FHA assum. loan. 538-1071.

Cars & Trucks

'88 Acura Integra LS, 27K mi., AC, PW, PL, AM/FM/cass., gray, ex. cond., \$10.5K. 996-8410.

'78 TransVan, V8, sleeps 3, good tires, runs good, body needs work, \$1,750, OBO. Cooper, 484-0775.

'89 Chevy Cavalier, \$8,200, 282-4587 or 538-1479.

'89 Honda Accord LX-1 Coupe, ex. cond., 17K, 5-spd., warr., \$13,500, OBO. 486-6859 or 333-6818.

'84 GMC Jimmy Sierra Classic, 62K mi., 5-spd., V6, good cond., \$4,650 nego. 486-1915.

'84 Peugot 505 STI, auto., sunroof, loaded, \$4,700. 283-5310 or 992-3014.

'82 Mercury Capri, Limited Ed., needs body work, mag wheels, BO. x38502 or 486-9191.

'89 Ford Mustang LX 2.3 Hr, 5-spd., PWR, 8K mi., ext. serv. plan, \$7,500. Shari, 283-6538 or 486-6142.

'83 Mazda RX-7 GSL, ex. cond., 75K mi., sunroof,

60 series tires, new brakes, 5-spd., \$3,970. 478-1596 or 486-4508.

'89 Hyundai Excel, auto., sunroof, 12K mi., ext. warr., ex. cond., \$1,500 down, take up notes. x35294 or x32161.

'72 VW Beetle, fair cond., \$600. Keith, 283-5307 or 482-2707.

'80 Olds Cutlass, 4-dr., good cond., \$1K, OBO. 554-6138.

'90 300ZX 2 plus 2, ex. cond., loaded, warr., \$27K. Bryan, 332-7499.

'73 VW Karmann Ghia conv., runs well, \$2,700. Debbie, x35154 or 488-7267.

'86 34' motor home, 6.5 KW, queen bed, din., couch, 2 side chairs, microwave, TV ant., sleeps 6, \$29,500. Rich, 488-7082 or 457-4605.

'86 Honda Prelude, 5-spd., sunroof, low mi., ex. cond., \$8K. 333-3166.

'83 Pont. Firebird, auto., T-tops, 78K mi., good cond., \$2,750. Bob, x32208 or 474-4769.

'65 Mustang, reb. 6 cyl., new clutch, looks/runs good, \$2,500, OBO. Rob, x30762 or 992-4507.

'89 Mazda MX-6 GT-turbo, loaded, moonroof, warr., ex. cond., \$13,345. Jeff, x39295 or 488-6033.

'80 GMC Rally STX van, 8 pass., reb. 6 cyl. and/or '84 Dodge customized Prospector van, 7 pass. x33656 or 486-8276.

'83 Porsche 911 Targa, 36K mi., 2 bras, cover, alarm, warr., \$22,500. David, 554-2992 or 282-3212.

'80 Dodge Colt, 86K mi., good cond., \$975. 333-7804 or 799-9101.

'79 International Scout 4 WD, V8-345 4 bbl., soft/hard top, roll bar, fresh trans., \$3,500, OBO. Wayne, 283-6514 or 337-5990.

'83 Dodge Shelby Charger, 5-spd., 102K mi., low profile tires, runs good, \$1,495. 473-4433.

Cycles

'78 Honda dirt bike, 80cc, ages 8-12, \$225. Dianne, x32072.

'27' Nishiki Rally 10-spd., 16" FRM, like new, \$95; Schwinn Predator dirt bike, chrome moly, ex. cond., needs tires, \$50. Dan, 283-5369 or 488-5051.

'89 Honda Hurricane, 3K mi., helmet incl., ex. cond., \$3,200, OBO. 283-5712 or 532-1265.

'85 Honda Shadow 700 cc, 35K mi., needs repair, will start, \$400. Daniel, x38835 or 482-8494.

'81 Honda CB-900F sport model, fresh Avon tires, helmet incl., 13K mi., \$1K, OBO. Wayne, 283-6514 or 337-5990.

Boats & Planes

Custom Plantadosi racing skulls (oars), ex. cond., \$125. Samouca. x35053 or 482-0702.

'19 Crestline boat IB/OB, 165hp, ex. cond., \$3,500. 862-3929.

'84 Mastercraft ski boat, new cable/brakes, \$12,500-sailboard; Bic Rock and Roll, \$400. Rich, 283-4811 or 486-6142.

'25' center console Robalo, '82-'83 T-150 Evinruds, low hrs., fully equipped, \$17K, OBO. x38825 or 487-8018.

'17' Lamar-Classic, lap-strake fiberglass body, 115 Evin., semi deep, \$3,500, 538-1849.

'16' Renegade ski boat, 140hp Evin., SST prop, new seats/paint/ignition sys., \$2,700, OBO. 333-6868 or 486-7846.

Audiovisual & Computers

Sony integrated stereo AV amp TA-AV480 w/ program. rem., 120 watt w/15 watt for surround sound,

Today

Houston Space Society—The Houston Space Society will present a lecture by Alex Dessler, chairman of Rice University's Department of Space Physics and Astronomy, at 7:30 p.m. Sept. 21 in the Embassy Room, University Center, University of Houston. Dessler's topic is "Will NASA Go Down Like the Hindenburg?" for more information, call 639-4221.

Cafeteria menu—Special: Salisbury steak. Entrees: baked scrod, 1/4 broiled chicken with peach half. Soup: seafood gumbo. Vegetables: cauliflower au gratin, mixed vegetables, buttered cabbage, whipped potatoes.

Monday

Cafeteria menu—Special: beef and macaroni. Entrees: ham steak, parmesan steak. Soup: chicken and rice. Vegetables: green beans, carrots, au gratin potatoes.

Tuesday

BAPCO meeting—Bay Area PC Organization (BAPCO) will meet at 7:30 p.m., Sept. 25, at the League City Bank and Trust. For more information contact Earl Rubenstein, x34807, or Tom Kelly, 996-5019.

Smoking cessation—The Smoking Cessation Program on-site is scheduled at 3:30-4:30 p.m., Sept. 25, in Bldg. 45, Rm. 304. To sign-up for future programs contact the Human Resources Development Branch (AH3), x33078.

Cafeteria menu—Special: Mexican dinner. Entrees: potato baked chicken, barbecue spare ribs. Soup: tomato. Vegetables: squash, ranch beans, Spanish rice, broccoli.

Wednesday

JSC Astronomy Seminar—The JSC Astronomy Seminar will be from noon-1 p.m., Sept. 26, in Bldg. 31, Rm. 129. A videotape featuring V. Courtillot — "Internal Cause of the Cretaceous-Tertiary Boundary Events" will be shown. For more information, call Al Jackson, 333-7679.

Photonic technology seminar—The Physical Optics Corp. will conduct

a seminar in photonic technology from 8:30 a.m.-11:15 a.m. and 1:00 p.m.-3:45 p.m., Sept. 26 in Bldg. 45, Rm. 551. For more information call Dean DeJardins, x34132.

Managing risk—A course entitled "The Executive's Approach to Managing Risk" will be offered from 10 a.m.-4 p.m. Sept. 26 via the JSC closed-circuit television system. Check the JSC TV channel guide Sept. 26 for the proper channel or those interested can reserve a seat in Bldg. 45, Rm. 203, by calling Sheryl Gates, x33074. For more information call Tim Johnson, x32604.

Hispanic Heritage—JSC will observe Hispanic Heritage Month with a program at 9 a.m. Sept. 26 in Teague Auditorium. This year's program will include a general session, a luncheon and a panel discussion. For information and luncheon tickets call Lupita Armendariz, x30604 or any Hispanic Advisory Committee member.

Cafeteria menu—Special: baked meatloaf with Creole sauce. Entrees: baked scrod, liver and onions, ham steak. Soup: seafood gumbo. Vegetables: beets, Brussels sprouts, green beans, whipped potatoes.

Thursday

AIAA kickoff—The American Institute of Aeronautics and Astronautics - Houston Section is kicking off its 1990-1991 monthly dinner meetings beginning at 5:30 p.m., Sept. 27 at the Gilruth Center. For reservations call Sarah Leggio at 282-3160 no later than Sept. 24.

Cafeteria menu—Special: smothered steak with dressing. Entrees: chicken and dumplings, corned beef with cabbage. Soup: beef and barley. Vegetables: spinach, cabbage, cauliflower au gratin, parsley potatoes.

Sept. 28

SCS meets—The Houston Chapter of the SCS's meeting will be from 11:45 a.m.-12:45 p.m. Sept. 28 at Lockheed Plaza 3, Pic Room, 1150 Gemini Ave. The session will include a presentation by IBM's Bill Bryan entitled "A Flexible Flight Computer Interface Architecture for Space Flight Simulations." For information call

Wade Webster, 486-6450.

Cafeteria menu—Special: tuna and salmon croquette. Entrees: pork chop with yam rosette, Creole baked cod. Soup: seafood gumbo. Vegetables: Brussels sprouts, green beans, buttered corn, whipped potatoes.

Oct. 3

IEEE video conference—IEEE Galveston Bay Section Video Conference will be at 10:30 a.m., Oct. 3, in the Gilruth Center. Registration deadline is Sept. 28. For more information, call Andy Lindberg, x31474.

Oct. 9

Technology van—The NASA Technology Transfer Van will be at JSC from 9 a.m.-1 p.m. Oct. 9 in the parking lot south of Bldg. 25. The 60-foot van's displays highlight the importance of transferring technology to the private sector.

Oct. 20

Wings Over Houston—The 1990 Wings Over Houston Airshow will be Oct. 20-21 at Ellington Field. The U.S. Marine Corps' vertical take off and landing jet, the Harrier, will participate and the Confederate Air Force will celebrate the 50th Anniversary of the Battle of Britain with its WWII airpower demonstration. Contact Col. Ray Jones, 850-7545, or Lu Lewis, 784-5200, for more information.

Oct. 23

BAPCO meeting—Bay Area PC Organization (BAPCO) will meet at 7:30 p.m., Oct. 23, at the League City Bank and Trust. For more information contact Earl Rubenstein, x34807, or Tom Kelly, 996-5019.

Oct. 28

Bicycle ride—The Texas Coastal Century bicycle ride, a comprehensive tour of the greater Bay Area, will be held from 8 a.m.-5 p.m. on Oct. 28 at the University of Houston Clear Lake. Proceeds will benefit the Houston Food Bank and University of Houston-Clear Lake recreation and sports. Early registration by Oct. 1 is \$10; registration after Oct. 1 is \$15. For applications and more information, visit the Gilruth Center. Call Mike Prendergast at 335-2505 for details.

\$275; Sony F-30 8mm camcorder w/125W video light, \$600. x33233 or 482-9447.

Apple IIC, 12" monitor, EXT. drive, 300/1200 modem, mouse, SW, \$600. 538-1479.

12 MHz 286, 4 meg RAM, Coproc., 2S, 1P, EGA, 2x20 meg HD, 1.1 cont., 1.2M & 720K floppies, mini tower w/230 W.P.S., \$1,500, OBO. Bryan, x38204.

Scuba dive comp., U.S. Divers J.M. Cousteau Data Scan III elec. dive comp., built in elec. dive tables, replaces press. gauge & depth gauge all-in-one, 1 mo. old, \$550, OBO. Patrick, x32635 or 488-1079.

Macintosh SE, 2 floppy drives, keybd., 1 meg mem. or more. Ken, 280-2404 or 473-2602.

Casio FC-1000 Graphic Fin. Consultant calculator, \$60; TRS-80 Modem II, 300 baud prog. modem, \$30. Tom Clark, x49842.

Magnavox Camcorder, ex. cond., \$650; PC-XT w/ color, 20m HD, 640K, \$900. James, 554-2929.

Musical Instruments

Conn cornet, good cond., \$275. Kathy, x39190 or 332-6305.

Concert Grand piano. Marv, 334-4493 or 332-4879.

Bach 42B Trigger trombone, ex. cond., \$595. Scott, 944-5624.

Lost & Found

Found: Jimmy Connors pres. sunglasses, tortoise-shell frames, grad. shaded lenses, claim in Still Photo Lab, Bldg. 2, room 187. x34231.

Pets & Livestock

Baby cockatiels, cinnamon, pied, pearl, gray, hand fed, tame, linda, 484-7834.

Free fem. spayed cat, gray/white, shots, feluk. neg. x35056 or 474-4132.

AKC min. purebred Dachshund blk. male pup, born 7-30-90, \$175. Jeanne, 488-3235.

6.5' boa constrictor, very tame, low maint., cage & hotrock incl., \$175, OBO. Rich, x38519 or 996-7630.

AKC min. Schanuzer pups, born 7-24-90, salt/pepper & blk., wormed, tails docked, dew claws remov., \$200. Debbie, x36545 or 452-3055.

4 Siamese kittens, 8 wks. old, 2 males, 2 fem., \$25. Brenda, x38183 or 474-7262.

AKC Dachshund pups, born 7-6-90, standard, smooth, red and blk/tan, shots/wormed, Ch. bloodline. Emelie, x37234 or 489-1390.

Household

Queen sofa/sleeper, matching love seat, beige, ex. cond., \$350. Kathy, x39190 or 332-6305.

Pecan dresser w/mirr., armoire, nightstand, queen hdbd., \$385; solid maple rocker, \$100; couch, queen sz. bed, loveseat, brn/taupe, \$375; twin matt/box springs, Sealy, \$50; blk. swivel captains chair, \$30. Dianne, x32072.

Wtrbd., single, incl. hdbd., drws. on bottom, \$50. x37060.

Rattan round glass-top table w/4 rattan chairs, good cond., \$100. 486-1915.

Sofa/loveseat, beige, good cond., \$100; glass coffee table, \$40; JVC stereo rack, \$45; tv stand, \$25. Ted, x36894 or 280-9595.

Childcraft crib, chest of drawers, crib converts to youth bed, matt. ex. cond., \$300. Diane, x30566 or 480-2774.

Imitation Duncan-Phife drop leaf DR table w/ mahogany veneer, 3x2 folded, seats 12 ext. minor wr. damage to ext. leaves, \$50. R. Franco, 992-2711.

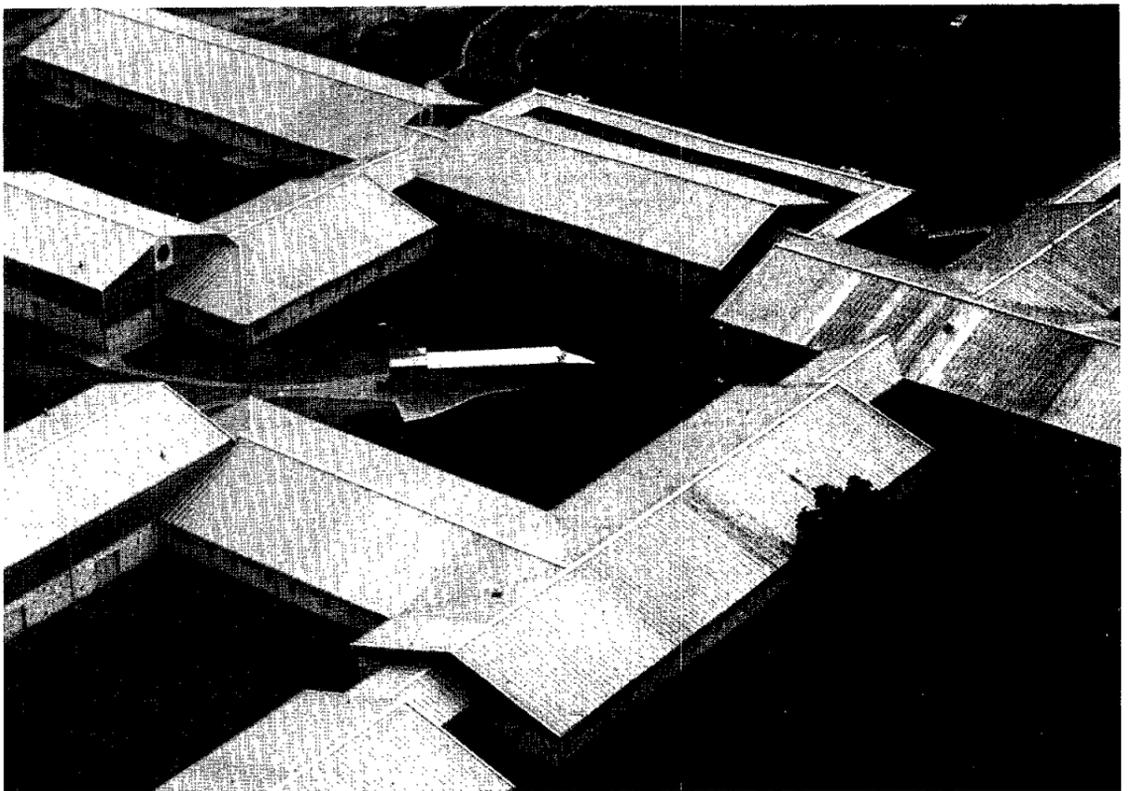
Full sz. box spring, matt., \$125. x38896 or 482-9447.

Sofa/loveseat, off-white, beige, some peach w/oak trim, good cond., \$150. x38896 or 482-9447.

Lg. Kenmore microwave, 700 watt, 1.3 cu. ft., ex. cond., \$125. x30096 or 9

Move Over Monkey Bars

JSC helps Texas elementary school teacher put together playground-sized shuttle



By Susan Aisup

An elementary school in Dripping Springs, a small town outside of Austin, is home to a space shuttle mock-up that is sending its students' imaginations — and test scores — soaring.

The shuttle mock-up is the brain child of teacher Paula Formby, who put it together with the technical assistance of JSC's education specialists and took part in space education workshops held at JSC this summer.

"NASA offers these opportunities in education more than anyone else," Formby said. "Positive opportunities for us to be involved in education. It's so exciting!"

JSC Education Specialist Jim Poindexter said there has been an increase over the past three years in the number of teachers participating in the summer programs. Requests for information keep pouring in as well.

"We are here to help," Poindexter said. "The kids really get excited. It works, and you can't knock success."

Poindexter said he's also seen a jump in the number of big projects schools are willing to embark upon as well.

"There are shuttle mock-ups in New Caney, the Woodlands and of course Dripping Springs, and we're just talking about this state," Poindexter said.

The shuttle parked in the Dripping Springs Elementary School playground has the school's students, and the whole town, excited about space.

"They had low test scores in science and math before the project," Formby said. "Now, they're soaring."

"If you could just see their faces when I take them through the shuttle," she said. "They're so excited. If they have something to work for, they'll do better."

Built on a concrete slab that extends out in the shape of the shuttle's wings, "Challenger" is 77 feet long and 30 feet wide. That's two thirds the size of an actual orbiter.

The groundbreaking ceremony for the aluminum-plated spacecraft was one year ago this week. The project was completed this summer.

During the school year, the shuttle is used for classroom instruction and after school

meetings of the town's Young Astronauts chapter. During the summer, the Young Astronauts will use the shuttle for "Space Camp."

Formby got the money to build the mock-up from a \$30,000 U.S. Department of Education grant. The science teacher was named a Christa McAuliffe fellow in 1989, one of 81 American teachers in the nation.

"I applied for the innovative grant," Formby said. "After I received it, people got excited."

With offers to help and community

"I wanted to make sure that my school remained committed to space whether I was there or not," she said.

Dripping Springs Elementary School students have shown they are committed to space education. During the school year, the students bring in articles about NASA, keep notebooks on space exploration and read books on space.

But the big event is the space camp held during the summers when the students "fly" the shuttle mock-up.

students where the focus is on boosting science and math skills. During space camp, the three groups rotate.

Students in mission control watch actual scenes of the shuttle launching, solid rocket booster separation, external tank separation and landing on TV monitors. All of the video is sent to the school courtesy of JSC. On the wall, a map shows the path of the shuttle's orbit with a trail of blinking lights.

For the students in the crew compartment, life is a little more difficult.

"The computer throws problems at the students such as a fire in the payload bay," Formby said. "They have to solve the problem to survive and have a successful mission."

Young Astronaut Patrick Rose attended space camp this summer. The sixth grader's crew had to combat a fire on the aft flight deck and had a problem releasing the solid rocket boosters. The crew was forced to "land" the orbiter unexpectedly but everyone survived.

"I was nervous," Rose said. "There's an alarm that goes off and everyone in the compartment gets scared and says, what's wrong, what's wrong?"

In the shuttle classroom, the students learn about NASA projects such as the Space Station *Freedom* and the Hubble Space Telescope with information and kits provided by JSC.

The lessons have had a huge impact on Dripping Springs Elementary School students.

"My goal is to be an astronaut and land on Mars," said Rose. "I was inspired by Young Astronauts and Mrs. Formby. Before the program I wanted to be a lawyer."

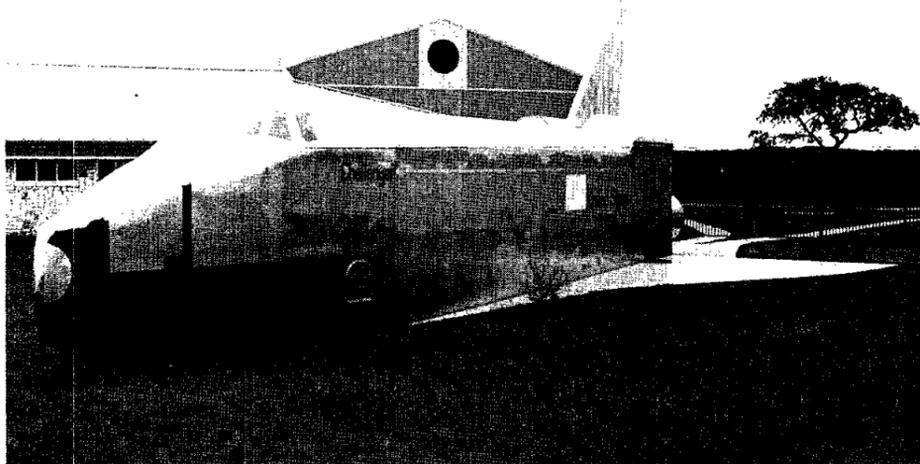
Another sixth grade student who took part in the program, Terri Ritter, wants to pursue a space-related career as well.

"I want to be a teacher in space and build a space shuttle like Mrs. Formby," said Ritter.

Formby said the shuttle mock-up not only makes learning more fun for the students, it makes her job more interesting. She plans to continually update and add more hardware to the orbiter to make the simulated mission even more realistic.

But for now, she's pretty satisfied.

"I'm amazed," she said. "It's like a dream materializing in front of me. It's everything I've ever wanted."



Top: "Challenger" is poised for "flight" in the playground at Dripping Springs Elementary School (DSES). Above: Instead of painting NASA on the wings, teachers painted DSES. Bottom left: Students participate in a simulation in Mission Control, which is in the tail of the mock-up. Bottom right: Computers and monitors make the novice student astronauts' experiences more realistic.

donations, Formby was able to turn the \$30,000 into a shuttle mock-up worth about \$120,000. Formby said building the shuttle for mission simulations just seemed like the logical thing to do.

"The shuttle makes it more realistic," Formby said. "I wanted the kids to see career opportunities in science."

Formby said she believes children decide what career they want to pursue when they are in elementary school. But that wasn't the only reason she wanted to put the money towards something so permanent.

A network of personal computers, laser disc players and monitors inside the shuttle allows them to participate in any one of six simulated missions.

And just like the JSC mission simulations, the Dripping Springs shuttle computer throws malfunctions at the novice astronauts.

During the mission, two students sit in the shuttle cockpit which is linked by intercom and closed-circuit television to the students in mission control, located in the tail of the orbiter. The mock-up's middle section provides a classroom for another group of



JSC alumni accept Marshall jobs

Two JSC alumni—Jay Honeycutt and Hank Hartsfield—have recently accepted high-ranking jobs at Marshall Space Flight Center.

Honeycutt, former deputy manager of the National Space Transportation System at JSC, has been appointed acting deputy director at Marshall. He takes over for Dr. J. Wayne Littles, who will attend Harvard Business School's Advanced Management Program.

Most recently, Honeycutt was director of Space Shuttle Management and Operations at Kennedy Space Center. He joined NASA at JSC in 1966 and earned increasing responsibility until his departure in March 1989.

Hartsfield, a former astronaut,

has been appointed deputy director for operations within the Space Station Projects Office at Marshall. He'll be responsible for planning and management of space station operations utilization capability,

JSC People

and will serve as a liaison with JSC's Astronaut Office on matters related to the design of space station as they affect crew safety, efficiency and comfort.

Hartsfield, who flew on STS-4 and commanded STS-41D and STS-61A, recently completed an assignment

at NASA Headquarters as director for technical integration and analysis in the Office of Space Flight.

Station avionics boss

Carroll T. Dawson has been appointed special manager for Avionics Integration in the Space Station Projects Office.

He will be responsible for managing the Projects Office Software Control Board, conducting the Project Avionics Status Reviews and acting as the Architectural Control Document agent for the Data Management System.

Edward J. Kenyon will replace



Honeycutt



Hartsfield



Dawson



Kenyon



Vilas

Dawson as acting manager of the Avionics Office in the Space Station Projects Office. Kenyon will be responsible for managing, coordinating and integrating center and contractor activities associated with avionics development, testing and delivery of operational software and flight data systems.

Vilas receives medal

JSC Space Scientist Faith Vilas

recently received the Antarctica Service Medal from the Department of the Navy for meteorite collection work.

Vilas spent six weeks on a field expedition camping out in the Transantarctic Mountains in 1987-88. JSC Director Aaron Cohen presented the Navy award Sept. 5.

Vilas, one of several JSC workers who have participated in Antarctic research trips, collected meteorites that are now in JSC's collection.



JSC Photo by Bill Blunck

ELBOW ROOM—Dr. Don Robbins, Space and Life Sciences deputy director, officially opens the newly relocated Graphics Analysis Facility from its second floor spot in Bldg. 15 to a more spacious location in the building's Rm. 119. The open house and ribbon cutting were Sept. 12. Employees who work in the facility do computer graphic analysis of crew task performance for both the space shuttle and Space Station Freedom. Employees also use computer graphics to design safe and efficient work and living spacecraft environments. At left is Linda Orr, facility manager, and at right is Chris Perner, chief of the Man-Systems Division.

Employees earn patent, tech brief awards

Nineteen JSC employees received Patent and Tech Brief Awards in a ceremony last week in Teague Auditorium. JSC Director Aaron Cohen presented the awards.

Patent Award winners included: David A. Wolf, for a Three Dimensional Cell to Tissue Assembly Process and a Three Dimensional Co-Culture Process; George A. Salazar for a Reconfigurable Fuzzy

Cell; and Leo G. Monford for a Magnetic Ball Lock Pin.

Tech Brief Award winners included: Frederic S. Dawn and Joseph J. Kosmo for Space Suit Restraint Fibrous Structures; Richard D. Juday for a Two-Dimensional Vernier; Wallace C. Tuthill Jr. for a Dual Diaphragm Tank with Telltale Drain; Gerard D. Valle for an ICOSA Cupola for Space Station Freedom; E. Steve Falls for

a Tube Flare Tool and Staking Pliers; and Millard F. Reschke and Barry M. Levitan for Otolith Tilt, Translation and Reinterpretation Goggles.

Also receiving Tech Brief Awards were: Christopher J. Culbert, Brian L. Donnell, Joseph Giarrantano, R. Bowen Loftin, Huyen-Anh V. Ly, Gary D. Riley and Robert T. Savely, all for the CLIPS Intelligent Tutoring System.

JSC Clinic will offer free flu shots beginning Monday

By Pam Alloway

The JSC Clinic is readying the forces against its annual foe — the flu bug.

Free influenza inoculations will be offered again this year to those interested in taking the initiative against the nagging disease. The vaccine will be available beginning Monday and will be given in the JSC Clinic daily from 10 a.m.-noon, and

from 2-4 p.m.

About 500 people come into the clinic every year for the inoculation, said Dolores Bellflore, the JSC Clinic's contract administrator. The inoculation period usually ends in December although later requests can be honored, she said. Kelsey-Seybold has the JSC Clinic contract.

Influenza virus infections occur

every year in the U.S. but vary greatly in incidence and geographic distribution. The center for Disease Control Immunization Practices Advisory Committee advocates vaccinations for people suffering from heart disease, chronic bronchopulmonary diseases such as asthma and emphysema, and diabetes mellitus. Pregnant women should check with their private physicians when they are

considering whether to be inoculated, said Bellflore.

Anyone requesting the vaccine must sign a consent form acknowledging possible reactions, which can include flu symptoms.

"The idea behind the vaccine is to expose the person to a small dose of the disease which allows the body to build up its immunity to the disease by producing antibodies that can

combat a full dose of the disease later on," said Gary Caylor, JSC occupational health officer.

Adults require only one dose and Caylor said appointments are not needed unless an employee cannot make the scheduled shot times. Bellflore cautioned those wishing to get the inoculations that the first two weeks the shots are offered generally are busy in the clinic.

Magellan starts mapping

(Continued from Page 1)

operations after engineers sent a new set of computer instructions to the spacecraft that they hoped would allow them to regain communications in the event of future communications losses.

Engineers lost radio contact with Magellan for 14 hours starting Aug. 16, then for 17 1/2 hours beginning Aug. 21. The Aug. 16 communication blackout happened only hours after Magellan used its radar for its first pictures of Venus during two orbits around the planet. Magellan sent only 1/12 orbits worth of picture information to Earth before controllers lost contact.

The \$744 million mission was designed to map up to 90 percent of Venus' surface over the next 243 days, the amount of time it takes Venus to complete one rotation. The space shuttle Atlantis deployed Magellan on May 4, 1989 and the spacecraft began orbiting Venus on Aug. 10 after a roundabout 948 million mile voyage from Earth.

Scientists designed the spacecraft's radar to produce pictures 10 times more detailed than those produced by Earth-based radar or radar on the Soviet Venera 15 and 16 spacecraft, which reached Venus in the mid-1980s.

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Discovery tests continue

(Continued from Page 1)

as the remaining hydrogen leaks are repaired."

Possibilities for near-term work in identifying the problem include a second tanking test at Pad 39A, possibly next week, with special instruments such as baggies and television cameras in the aft fuselage. Although no firm decisions have been made, plans are to correct the problem with Columbia remaining fully stacked and on a mobile launcher platform.

Work on Columbia, including replacement of a damaged seal, apparently slowed the leak by about

one-third prior to the latest launch attempt. The leak also is elusive since it apparently shows up only once the fuel lines have been chilled to near minus 423 degrees Fahrenheit, the temperature of liquid hydrogen.

On Discovery at Pad 39B, a flight readiness test of the main engines was scheduled for Thursday. A helium signature test of the fuel lines and engines is scheduled for Saturday.

Atlantis, now in Bay 2 of the Orbiter Processing Facility, is expected to be rolled out and over to the Vehicle Assembly Building Sept. 30.